

Nereid Shell Blisters in the Southern Quahog Clam

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THE nereid polychaete, *Neanthes arenaceodentata* Moore = *Neanthes caudata* (della Chiaje), is the apparent cause of shell blisters discovered in a population of the quahog clam, *Mercenaria campechiensis* Gmelin, sampled in Boca Ciega Bay, Florida. Thus far, nereid blisters have not been reported in quahogs from other areas of Tampa Bay or in other coastal regions of the United States. The worm-inhabited blisters were similar in appearance to scallop blisters caused by the nereid *Ceratonereis tridentata* (Webster), but different in appearance from blisters in hard clams caused by the spionid *Polydora ciliata* (Wells, 1965; Landers, 1967). Additional reports on biogenous disfiguration of shells include those by Wells and Wells (1962); Wells, Wells, and Gray (1964); Davis (1967; Blake (1969); Evans (1969); Haigler (1969); and Jones (1969).

BLISTER INCIDENCE, LOCATION, AND DAMAGE

Shell blisters in Boca Ciega Bay quahogs were discovered in a sample of living clams collected near the island of Tierra Verde on December 9, 1968 (Fig. 1). The clams in that locality were six years old and had the following average shell dimensions: length, 100.8 mm; height, 95.3 mm; width, 57.7 mm (Taylor and Saloman, 1970). During the following 16 months, monthly samples of at least 100 living clams were taken. Incidence of blisters in that period averaged 37 per cent and ranged from 30 per cent (March and October, 1969) to 51 per cent (December 1969). Among empty shells randomly collected in the same vicinity, a 44 per cent incidence of blister damage was also noted. Live worms were collected only from living shells, parasitism or another benefit to the worm from some activity or function of the clam is indicated.

Shell blisters in 91 per cent of the clams were found on one valve only, at the posterior end. Nine per cent of the quahogs had blisters on both valves. Up to one-half of the inner shell surface was raised by well-developed blisters, and in some clams the pos-

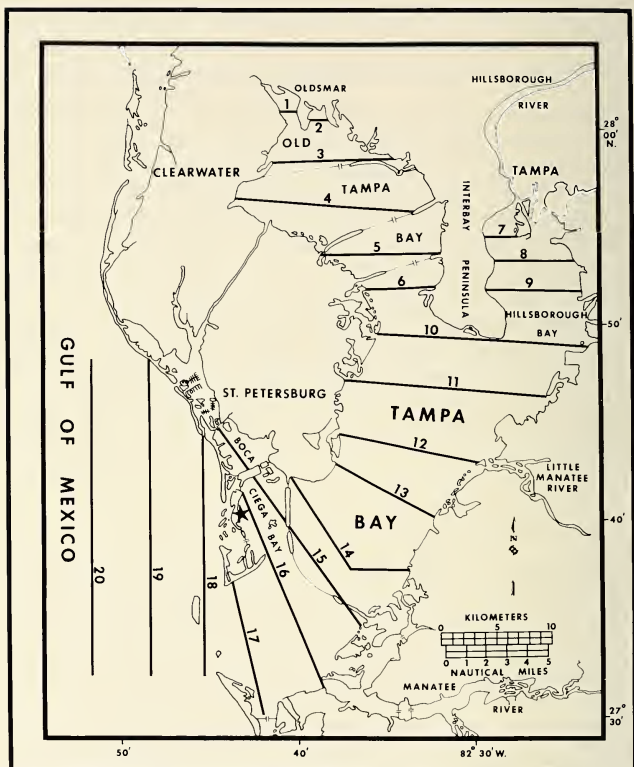


Fig. 1. Sampling transects of a benthic survey in Tampa Bay, Florida. The star indicates the location of a bed of quahog clams (*Mercenaria campechiensis*) infested with a nereid polychaete (*Neanthes arenaceodentata*) found in shell blisters.

terior adductor and retractor muscles were partially destroyed (Figs. 2 and 3). Density of worms in the sediment of the infected clam bed was about 128 worms per m^2 , computed from the number of animals in five substrate samples obtained with a plug sampler (Taylor and Saloman, 1969a).



Fig. 2. Damage from a shell blister containing the nereid polychaete (*Neanthes arenaceodentata*) in the quahog clam (*Mercenaria campechiensis*) collected in Boca Bay, Florida.

ECOLOGY OF THE WORM

Neanthes arenaceodentata has been reported from shallow water in temperate to tropical seas around the world. It inhabits floating masses of algae, crevices, and interstices among rocks, shells, fouling organisms, and sediments of sand or mud. Its diet consists mainly of algae, but may include small animals (Pettibone, 1963; Hartman, 1968). To our knowledge, *N. arenaceodentata* has never been reported in shell blisters.

Results of a benthic survey (Taylor, 1966) in which *N. arenaceodentata* was collected at 72 stations in Boca Ciega Bay and portions of Tampa Bay, substantiate previous observations on the



Fig. 3. Tissue damage to the posterior adductor and retractor muscles (tip of arrow) of a quahog clam (*Mercenaria campechiensis*) from Boca Ciega Bay, Florida, at the margin of a shell blister containing the nereid polychaete (*Neanthes arenaceodentata*).

worm's habitat. At more than one-half of the stations inhabited by the worm, the bottom was covered with sea grasses and attached algae. Average sediment particle size was 2.6 phi (fine sand), and the average shell (calcium carbonate) composition by weight was 10.3 per cent (Taylor and Saloman, 1969b).

N. arenaceodentata was caught mainly in relatively high salinity water in Tampa Bay. About 91 per cent of its occurrences were seaward of transect 13 (Fig. 1), where average annual salinity exceeds 25 ppt. All collections containing more than 100 worms per sample from a 14.2 liter bucket dredge (Taylor, 1965) came from the shallow vegetated bottom of Boca Ciega Bay where salinity normally exceeds 30 ppt (Taylor and Saloman, 1969b).

In northern waters, the upper size limit of *N. arenaceodentata* is about 70 mm long by 4 mm wide (Pettibone, 1963). The largest specimen collected in our survey was 30 by 4 mm, and the largest found inside a shell blister was 20 by 1 mm. Worms longer than 15 mm were sexually mature, and gravid individuals were collected in February, April, May, September, and November. Water tem-

peratures during those months range between 9-31 C, and it seems likely that the worm breeds in every month of the year. Year-round breeding in subtropical waters has been found in a number of other polychaete species in Biscayne Bay, Florida (McNulty and Lopez, 1969).

No epitokous state has been reported for *N. arenaceodentata*, and females produce from 143-791 young. The embryos are incubated by the male for about 21 days, and during that time there is a strong male-male and male-female fighting reaction. Embryos are unciliated and do not pass through a pelagic stage. The young reach sexual maturity in about two months, and males may reproduce more than once. Females are either eaten by the males or die after spawning (Reish, 1957).

SHELL BLISTERS AND QUAHOG FISHERIES

The shell blisters containing *N. arenaceodentata* consisted of a raised conchiolin membrane, which is produced by the clam and separates the worm from the mantle cavity. In the blister cavity, the worm accumulates fecal material and detritus, which gives the blister a dark and unattractive appearance. Such a conspicuous abnormality makes infested individuals unacceptable for commerce in half-shell and steamer clams. Furthermore, blister formation probably impairs the vitality of the host, and in well-developed blisters, damage to soft tissues may cause clam mortality. Consequently, recreational and commercial quahog fishermen should regard *N. arenaceodentata* as a possible threat to hard clam fisheries and report clams containing blisters to local or Federal conservation agencies.

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